

Remarks**I. Status**

Claims 1-5 and 10-45 are pending in the application. Claims 1, 5, 10, 29, 32, 38, 42, and 45 are amended.

II. Claim Rejections - 35 USC § 112

Claims 1-5, 10-17, 25-28 and 32-45 have been rejected under 35 U.S.C. 112 for allegedly failing to comply with the written description requirement. The rejection is respectfully traversed.

The Examiner has alleged that the “newly added limitations in the claim amendment filed on April 9, 2008, which require a ‘read operation’ in a ‘first memory location’ that is different from the ‘second memory locations’ where I/O accesses are recorded, is not supported by the original specification.” The applicants respectfully disagree, and submit that these “newly added limitations” are supported in the specification.

The “newly added limitations” mentioned by the Examiner (or limitations similar thereto) are recited in independent claims 1, 5, 10, 32, 38, 42, 45. For purposes of convenience, these limitations will be discussed below with reference to claim 1. However, the reasoning set forth in the discussion below applies equally to independent claims 5, 10, 32, 38, 42, and 45 as well.

A. Claim 1

Independent claim 1 requires, in part, “identifying at least one data block comprising file data stored in at least one first memory location on a storage device,” “performing at least one read operation with respect to the at least one data block, the at least one read operation comprising performing at least one I/O access to the at least one first memory location on the

storage device,” and “recording, in one or more second memory locations different from the at least one first memory location, one or more I/O accesses performed with respect to the storage device in association with the at least one read operation.” The “newly added limitations” are supported in the Specification, as set forth below.

B. Stored Data is Read from “at least one first memory location”

In one example discussed at page 8, lines 8-10, the Specification discloses storing file data in, and performing read operations comprising I/O accesses to a “device 140,” which is a virtual storage device connected to one or more client computers: “In step 225, software program 120 uses the file system to thoroughly traverse all of the data on device 140, performing read operations on all the allocated blocks.” Thus, in this disclosed example, the “device 140” corresponds to the claimed “at least one first memory location.”

C. I/O Accesses are Recorded in “one or more second memory locations”

At page 8, lines 7-8, the Specification discloses recording I/O accesses in a “storage manager 155,” which is also shown in Fig. 1: “In step 220, storage manager 155 starts recording I/O accesses.” After the recording is completed the “storage manager 155” has a “list of all the blocks on the device that were accessed.” (Specification, page 8, lines 21-22). Therefore, in this example, the “storage manager 155” corresponds to the claimed “one or more second memory locations.”

D. The “First” and “Second” Memory Locations are Different

The “storage manager 155” is different from the “device 140,” as required by claim 1. At page 6, lines 6-11, the Specification explains that “Storage management system 150 includes storage manager 155,” and also that “Storage management system 150 may be realized using a storage server.” In addition, Fig. 1 clearly shows that the “storage management system 150” is clearly different from the “device 140.”

Because the limitations discussed above are supported in the Specification, the rejection is improper and should be withdrawn.

III. Claim Rejections - 35 U.S.C. § 103**A. Claims 1-2, 10-11, 13, 26, 28-29, 31-32, 34-35 and 37-44**

Claims 1-2, 10-11, 13, 26, 28-29, 31-32, 34-35 and 37-44 have been rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over U.S. Patent No. 5,873,101 (“Klein”) in view of U.S. Patent No. 6,665,779 (“Polfer”). Claims 1, 10, 29, 32, 38, 42, and 45 are amended and the rejection is respectfully traversed.

1. Amended Claims 1 and 10

Independent claim 1 defines a method for replicating data from a storage device. Claim 1 requires “identifying at least one data block comprising file data stored in at least one first memory location on a storage device” and “performing at least one read operation with respect to the at least one data block, the at least one read operation comprising performing at least one I/O access to the at least one first memory location on the storage device.” Claim 1 also requires “recording, in one or more second memory locations different from the at least one first memory

location, one or more I/O accesses performed with respect to the storage device in association with the at least one read operation” and “identifying, based on the recorded I/O access information, one or more data blocks on the storage device that contain valid data.” Claim 1 has been amended to require “replicating the data blocks that contain valid data by copying only the data blocks that were accessed during the at least one read operation.” Support for the amendments to claim 1 is found at page 8, line 20 to page 9, line 5, for example.

Independent claim 10 is a system claim that corresponds to claim 1, and has been amended in a similar manner.

a. Klein

Klein describes a method and system for backing up data and restoring data to a database. (Abstract). Data is stored in data segments comprising a plurality of blocks of data. Each data segment includes an “extent map” identifying the location and size of “extents” within the data segment. (Col. 4, lines 53-54). An extent is a logical storage structure including a specific number of contiguous data blocks. (Col. 4, lines 53-54).

Backing up a data segment from a first storage location to a second storage location in Klein involves copying the data blocks in the extents of each data segment, as well as the extent map, from a first location to a second location without analyzing the contents of either the data blocks or the extent map. (Col. 5, lines 1-6). Any suitable operating system routine or copy utility may be used to copy the data blocks. (Col. 5, lines 50-55). After the data blocks have been copied, location information in the data is corrected/updated. (Col. 5, lines 54-59). Therefore, it is important in Klein to maintain the original order of the data blocks in the extents

so that location-dependent information contained in the data blocks can be accurately updated after it is copied. (Col. 5, lines 17-26).

Markers may be maintained within the extents to indicate boundaries between data blocks that have been allocated and are in use, and those allocated data blocks that have not yet been used. (Col. 5, lines 31-34). When data is copied during the backup procedure, the markers are used to ensure that only those allocated data blocks that are in use are copied. (Col. 5, lines 35-39). The markers may be stored as part of the extent map, or in the data segment separate from the extent map. (Col. 5, lines 37-40).

b. Polfer

Polfer discloses a method for backing up data from a storage device. The storage device's file system maintains a file allocation table ("FAT") to record where valid data is stored on the storage device. (Col. 6, lines 15-20). As is known in the art, a FAT is created when the storage device is formatted, and is continually updated as data is written or deleted from the storage device. The FAT contains a table containing bits indicating where file data is stored, but does not itself contain any file data. In accordance with Polfer, the FAT is examined, and a block map or file is generated based on the FAT in order to indicate whether selected blocks include valid data to be backed up. (Col. 6, lines 15-18). Specifically, the block map is generated by examining the FAT and setting flags in the block map indicating whether or not each of the selected blocks contains valid data. (Col. 6, lines 20-29). As a result, the block map includes an entry for each of the selected blocks to indicate whether the associated block has any data to be backed up. (Col. 6, lines 18-20). The valid data is then backed up by traversing the block map, and reading and backing up only the flagged data blocks. (Col. 6, lines 33-37). The

applicants wish to emphasize that the block map is created by reading the FAT, not by reading the files stored in the data blocks themselves, as discussed in earlier Amendments.

- c. **Neither Klein nor Polfer Teaches or Suggests replicating the data blocks that contain valid data “by copying only the data blocks that were accessed during the at least one read operation,” as required by amended claims 1 and 10**

Neither Klein nor Polfer teaches or suggests replicating the data blocks that contain valid data “by copying only the data blocks that were accessed during the at least one read operation,” as required by amended claims 1 and 10. The Examiner has admitted that Klein does not teach or suggest the claimed “at least one read operation” at page 4 of the Office Action, and therefore cannot teach or suggest this amended limitation. Polfer does not teach or suggest this limitation, either.

None of the other cited art teaches or suggests the combination of amended claims 1 and 10, either. Therefore, amended claims 1 and 10, and their respective dependent claims, are patentable over the cited art. The dependent claims include patentable limitations, as well.

2. Amended Independent Claims 29, 32, 38 and 42

Independent claims 29, 32, 38 and 42 are amended in a manner similar to claims 1 and 10. Therefore, amended claims 29, 32, 38 and 42, and their respective dependent claims, are patentable over the cited art for the same reasons set forth above with respect to amended claims 1 and 10. The dependent claims also contain patentable limitations.

B. Claims 18, 20 and 25

Claims 18, 20 and 25 have been rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Klein in view of Polfer, further in view of U.S. Patent No. 5,875,478 (“Blumenau”). The rejection is respectfully traversed.

1. Independent Claim 18

Independent claim 18 defines an apparatus to replicate data blocks on a storage device that contain valid data. Claim 18 requires a storage device configured to “store data in one or more data blocks” wherein “the storage device comprises a file system that identifies files stored on the storage device and storage location information for the respective files.” Claim 18 also requires a first processor configured to “record I/O accesses performed with respect to the storage device in association with read operations.” Claim 18 further requires a second processor configured to “perform read operations with respect to all files identified in the file system,” and “instruct the first processor to record one or more I/O accesses performed with respect to the storage device in association with the read operations.” Claim 18 further requires that the first processor is further configured to “identify one or more data blocks on the storage device that contain valid data based, at least in part, on the I/O access information recorded by the first processor” and “replicate the data blocks that contain valid data.”

Klein and Polfer are discussed above.

The Examiner admits in the Office Action that Klein does not “specifically disclose about a file system that identifies files stored on the storage device and storage location information for the respective files; and performing read operations with respect to all files identified in the file system” (Office Action, page 8). In this statement, the Examiner appears to allege that Klein

does not teach or suggest the claimed storage device that “comprises a file system that identifies files stored on the storage device and storage location information for the respective files,” or a “second processor” configured to “perform read operations with respect to all files identified in the file system,” as required by claim 18. Instead, the Examiner appears to allege that Blumenau discloses these limitations. The applicants respectfully disagree.

Blumenau discloses a computer system having backup capabilities for backing up data on a host storage disk of a computer to a remote archive repository. (Col. 1, lines 51-53). The computer includes a backup application that determines when data to be backed up should be copied to the remote archive repository, makes read requests to make a copy of data on the host storage disk, and makes write requests to store the copy at the remote archive repository. (Col. 1, lines 53-57). The system includes a file system that carries out a logical to physical mapping: given a file name, it accesses file tables to determine where the file is actually physically located. (Col. 3, lines 29-32). Blumenau discloses that the “backup driver 30” transfers blocks of information specified by the file system. (Col. 4, lines 5-8). In such a case, the “backup application 22” identifies a file to be backed up to the file system, and the file system identifies the physical blocks that are to be backed up to the “backup driver 28.” (Col. 4, lines 8-11).

Contrary to the Examiner’s assertion, Blumenau does not teach or suggest a processor configured to “perform read operations with respect to all files identified in the file system,” as required by claim 18. (Emphasis added). The passage cited by the Examiner as allegedly satisfying this limitation (column 4, lines 8-11, discussed above) discusses a single “file to be backed up,” and further discloses that Blumenau’s file system facilitates the backing up of such file by identifying to the “backup driver 28” the physical blocks that are to be backed up. However, nowhere does Blumenau teach or suggest backing up, or otherwise reading, “all” the

files in the file system, as required by claim 18. Merely disclosing a method for reading/copying a single file is not the same as teaching or suggesting performing “read operations with respect to all files identified in the file system,” as claimed.

None of the other cited references teaches or suggests this limitation, either. Therefore, claim 18 is patentable over the cited art.

2. Claims 20 and 25

Claims 20 and 25 depend from independent claims 18 and 1, respectively. For the reasons set forth above, claims 18 and 1 are patentable over the cited art. Therefore, claims 20 and 25 are also patentable over the cited art. Claims 20 and 25 also contain patentable limitations.

C. Claims 3, 12 and 27

Claims 3, 12 and 27 have been rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Klein in view of Polfer, further in view of U.S. patent Publication No. 2003/0195865 (“Long”). The rejection is respectfully traversed.

Claims 3, 12 and 27 depend from independent claims 1, 10, and 5, respectively. For the reasons set forth herein, claims 1, 10 and 5 are patentable over the cited art. (Independent claims 1 and 10 are discussed above; independent claim 5 is discussed below). Therefore, claims 3, 12 and 27 are also patentable over the cited art. Claims 3, 12 and 27 also contain patentable limitations.

D. Claims 4-5 and 14-17

Claims 4-5 and 14-17 have been rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Klein in view of Polfer, further in view of U.S. Patent No. 5,668,971 (“Neufeld”). The rejection is respectfully traversed.

1. Amended Independent Claim 5

Independent claim 5 is amended in a manner similar to claim 1. Therefore, amended claim 5 is patentable over the cited art for the same reasons set forth above with respect to amended claim 1.

2. Claims 4 and 14-17

Claim 4 depends from independent claim 1; claims 14-17 depend from independent claim 10. For the reasons set forth above, claims 1 and 10 are patentable over the cited art. Therefore, claims 4 and 14-17 are also patentable over the cited art. The dependent claims also contain patentable limitations.

E. Claim 19

Claim 19 has been rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Klein in view of Polfer, further in view of Blumenau and Neufeld. The rejection is respectfully traversed.

Claim 19 depends from independent claim 18. Claim 18 is patentable over the cited art for the reasons set forth above. Therefore, claim 19 is also patentable over the cited art. Claim 19 also contains patentable limitations.

F. Claim 21

Claim 21 has been rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Klein in view of Polfer, further in view of Blumenau and Long. The rejection is respectfully traversed.

Claim 21 depends from independent claim 18. Claim 18 is patentable over the cited art for the reasons set forth above. Therefore, claim 21 is also patentable over the cited art. Claim 21 also contains patentable limitations.

G. Claims 30 and 33

Claims 30 and 33 have been rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Klein in view of Polfer, further in view of U.S. Patent No. 6,757,778 (“van Rietschote”). The rejection is respectfully traversed.

Claim 30 and 33 depend from independent claims 29 and 32, respectively. Claims 29 and 32 are patentable over the cited art for the reasons set forth above. Therefore, claims 30 and 33 are also patentable over the cited art. Claims 30 and 33 also contain patentable limitations.

H. Amended Independent Claim 45

Independent claim 45 has been rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Blumenau in view of Klein, further in view of Polfer. The rejection is respectfully traversed.

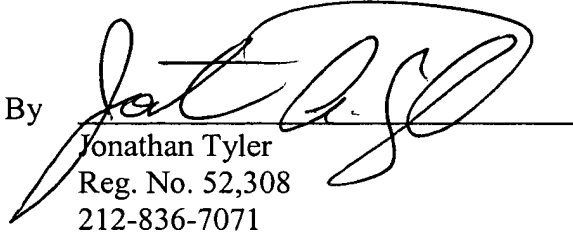
Independent claim 45 is amended in a manner similar to claims 1 and 10. Therefore, amended claim 45 is patentable over the cited art for the same reasons set forth above with respect to amended claims 1 and 10.

IV. Conclusion

In view of the foregoing, each of claims 1-5 and 10-45, as amended, is believed to be in condition for allowance. Accordingly, reconsideration of these claims is requested and allowance of the application is earnestly solicited.

Respectfully submitted,
Kaye Scholer LLP

By



Jonathan Tyler
Reg. No. 52,308
212-836-7071

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